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in the hope of finding out what reality is, and your experience will be like that of the great poet-philosopher, Shelley.

Unfathomable Sea! whose waves are years,  
 Ocean of Time, whose waters of deep woe  
 Are brackish with the salt of human tears!  
 Thou shoreless flood, which in thy ebb and flow  
 Claspest the limits of mortality!  
 And sick of prey, yet howling on for more,  
 Vomitest thy wrecks on its inhospitable shore;  
 Treacherous in calm, and terrible in storm,  
 Who shall put forth on thee,  
 Unfathomable Sea?

Yes, time is an unfathomable sea, treacherous in calm and terrible in storm, to those who put forth upon it in quest of reality. But he who turns his back on this ocean of time and searches for reality in the land of thought, which is its true home, will find the "modest creed" of this same poet-philosopher substantially true.

It is a modest creed, and yet  
 Pleasant if one considers it,  
 To own that death itself must be,  
 Like all the rest, a mockery.

That garden sweet, that lady fair  
 And all sweet shapes and odors there  
 In truth have never passed away:  
 'Tis we, 'tis ours, are changed; not they.

I know not what others may think and I claim to speak only for myself when I say that we have here, in Shelley's marvelous poem entitled "The Sensitive Plant," a far, far truer "image of reality" than Professor Alexander's dissolving stairs, which leads, as he admits, into the gloom.

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### THE SCOPE AND GENESIS OF COMPARATIVE PSYCHOLOGY

#### I

COMPARATIVE psychology, like its mother science, has had a long past and a short history. In fact it is doubtful whether it has had any history. There is no department or field in psychology which has been changing color, all the time since its inception, as much as comparative psychology.

While general psychology has recently been the recipient of many

aspersions on the ground that its definition is not universally accepted, its offshoot has had the much greater disadvantage of not even being generally discussed. Investigators writing on topics as wide apart from one another as zoology and philology seemed each to be certain that their sphere of investigation was none other than comparative psychology. A state of affairs in which the definition of a science is a mooted point denotes a higher stage of advancement than the case where definitions are taken for granted without the slightest attempt at orientation.

The great divergence in the subject-matter of comparative psychology is of course to some extent justified in virtue of the latitude of its scope. The objection, however, is to be directed against the identification of *a part with the whole of the field* and against the practise of including a subject under the category of comparative psychology simply because it *permits of comparison* with another subject, though the *point of view* from which that particular problem has been approached *does not happen to be a comparative one*.

In a very broad sense all science, and every field of a science, is comparative, inasmuch as every fact is related to some other fact. Every classification involves comparison. Especially is this true of general phenomena running through several different departments in diverse forms and guises. Thus inhibition or adaptation may be studied comparatively not only in the different species but in the different senses of man alone. Forel's casual remark that even human psychology is and must be a comparative psychology,<sup>1</sup> though apparently uttered by the author only in a zealous mood, could be taken more seriously were we not deterred by the vastness of the scope.

It is of course beyond question that such a broad view of comparative psychology would render it not only unwieldy but also insignificant. The delimitation of the whole field so that the essential significance of the term *comparative* is brought into relief thus becomes an imperative necessity.

The first reference book to consult in that regard would naturally be the *Dictionary of Philosophy and Psychology*. The information obtained therein reveals two usages: a proper usage and a common usage. "The department of psychology which proceeds by the comparison of the minds of different animal forms. It properly includes

<sup>1</sup> A. Forel: "Die Berechtigung der Vergleichenden Psychologie," etc. *Journal f. Psych. und Neurol.*, Vol. 1, 1902, pp. 3-10. "Somit sehen wir dass bereits die menschliche Psychologie eine vergleichende Psychologie ist und sein muss."

As a matter of fact, Forel, like most other psychologists both prior and subsequent to him, understands by the term comparative psychology ("in the strict sense") nothing more than animal psychology.

man as compared with the lower animals although as commonly used it is synonymous with animal psychology.''<sup>2</sup>

The first conscious approach to the study of comparative psychology in English appears to be that of Romanes who regarded his field as the analogue of comparative anatomy, "for just as the latter aims at a scientific comparison of the bodily structures of organisms, so the former aims at a similar comparison of their mental structures."<sup>3</sup>

This parallelism might have been acceptable were it not for the fact that psychology has not only a *genetic* dimension, but a *collective* dimension as well. The parallelism between a bi-dimensional science like anatomy and a tri-dimensional science, such as is psychology, can, therefore, no more hold than that between, say, physics and biology. In his *Mental Evolution in Man*, Romanes has shown himself to be a comparative psychologist in the broad sense which his successors have lost sight of, but in so doing he has unwittingly strayed away from his previously established parallelism.

His younger contemporary, Lloyd Morgan, writing in 1894, tells us that discussing the "relation of the psychology of man to that of the higher animals"<sup>4</sup> is the central object of an introduction to comparative psychology. But the pioneer of comparative psychology on this continent, Wesley Mills, in an address before the Association for the Study of Comparative Psychology at Montreal as early as 1887, identified comparative psychology with "all that pertains to the mind or soul of the animal kingdom."<sup>5</sup>

More recent writers both abroad and in this country have indeed been employing the terms animal psychology and comparative psychology interchangeably.

Yerkes alone, of all the psychologists, clearly perceived that it was unfair as well as unscientific to cut a chip and then proclaim that the block was hewn. The difficulty of referring to some one unitary thing which would justify the name comparative psychology was apparently constantly before him, as evidenced by the explanations in footnotes and digressions in the texts of articles as to the meaning of comparative psychology. The following footnote taken from a critical digest of the progress in comparative psychology is characteristic of the status obtaining in that field. "I use 'Comparative Psychology' in this connection in the commonly accepted sense of the psychology of all organisms excepting man. It seems to me desirable, however, that it should designate a method of investi-

<sup>2</sup> *S. v. Comparative Psychology.*

<sup>3</sup> J. G. Romanes: *Mental Evolution in Animals*, p. 5.

<sup>4</sup> C. Lloyd Morgan: *Introduction to Comparative Psychology*, p. ix.

<sup>5</sup> Wesley Mills: *Animal Intelligence*, p. 17.

gation rather than a division of the field of psychology, and that the expression 'Animal Psychology' as contrasted with 'Human Psychology' should designate that portion of the materials of the science which is usually known as Comparative Psychology."<sup>6</sup>

Five years later, however, Yerkes is not content with making explanatory or apologetic observations. In a short article which probably was prompted by his investigations at the Boston Psychopathic Hospital and increasing interest in abnormal psychology, he vigorously decries the practise of identifying comparative psychology and animal psychology. So far as the writer has been able to make out, it was the first call to his colleagues admonishing them to call a thing by its right name. To quote him, "This note on definitions is written with the hope that it may help to carry into oblivion the use of comparative psychology as synonymous with 'animal psychology,' and bring about the substitution of the natural, logical usage which the terms comparative and psychology, when linked, suggest."<sup>7</sup> It is needless to say that Yerkes's voice remained a *vox clamantis in deserto* in certain quarters, although fortunately the exigency of classification and compilation amidst the confusing terminology is tending to make cataloguers and compilers more circumspect as to captions or rubries; and animal psychologists or behaviorists will on that account find themselves almost constrained to employ the term "comparative psychology" more sparingly when they mean "animal behavior" or "animal psychology."

Sometimes it would seem (and this looks like an interesting observation on the psychology of psychologists) that the former term has been adopted as an elegant screen or euphemism for the latter. There is certainly a more refined atmosphere about a comparative study than about an animal study. The former gives an air of breadth and extensiveness which does not at all attach to the latter.

The tendency to deck out animal psychology with the more attractive subtitle is not prevalent in such works as Watson's and Washburn's alone, but dates as far back as 1877 when Schneider gives us as the descriptive title of his brochure *Die Unterscheidung* the further subheading *Vergleichend Psychologische Untersuchungen*. In the same year appeared the important work of Espinas on animal societies under the subtitle of *Etude de psychologie comparée*. In justice to Schneider and Espinas, however, it must be said that there is more ground for calling a broad animal investigation a study in

<sup>6</sup> R. M. Yerkes: "Recent Progress and Present Tendencies in Comparative Psychology," *Journal of Abnormal Psychology*, 1908, Vol. II., p. 271.

<sup>7</sup> R. M. Yerkes: "Comparative Psychology: A Question of Definitions." This JOURNAL, 1913, Vol. X., p. 581.

comparative psychology than for labeling a text-book or outline of animal behavior "Text-book of Comparative Psychology."

That the binary nomenclature in vogue among animal psychologists was not subserving a useful purpose may be inferred from the substitution of the heading "animal behavior" for the older one of comparative psychology in the Psychological Index of 1911. Since its inception in 1894, the caption in the Psychological Index has been *comparative psychology*. Apparently the editors of this compilation did not realize that between the alternative of classifying a misnomer and eliminating it entirely, as they have been doing, there was a third possibility—that of breaking up the identification of two different though allied subjects and treating them separately, as Köhler has done in the bibliography of the *Zeitschrift für Psychologie* prior to its coming under the influence of the Psychological Index.

## II

In our endeavor to demarcate the scope of a concept, two roads are open to us; and both enjoy the prestige that goes with time-honored procedures pursued by philosophers since the days of antiquity. *The Socratic method* of establishing the connotation of a concept by examining numerous instances and gradually eliminating all but a few which may be said to carry the essential characteristics of the concept, is scarcely satisfactory in our present issue, considering the colossal magnitude of our task. Besides, we all know what the words "comparison" and "comparative" mean. What our quest should be is rather to restrict its meaning in a technical sense, so as to serve a scientific purpose. In this respect, that is to say in its negative aspect, the Socratic method, as employed in the Platonic dialogues, proves to be a valuable asset in that it helps to keep in abeyance the too liberal as well as the too close attitudes taken towards a given term. From this angle we may turn to animal psychologists and inquire of them whether the comparison of different levels of human intelligence (normal as well as abnormal, supernormal and subnormal, amented and demented) may not with equal right fall under the rubric of comparative psychology. Likewise, may it not be conceded on the part of animal psychologists that the comparative description of various racial characteristics constitutes a substantial part of the field of comparative psychology proper now wholly appropriated by investigators of infra-human behavior? Certainly it is incumbent upon the latter to produce the writ upon which they base their exclusive claim.

*The second mode of procedure (psychogenetic), that of following*

up the usage of a term in a historical light, bears the impress of Aristotle and counts Locke among its sponsors. Is animal behavior coincident with comparative psychology as revealed by this test? One might suppose that the term comparative psychology originated in a biological or zoological atmosphere. Judging from its present surroundings we should have thought comparative psychology to be a soul-mate of comparative anatomy, a term which was employed in English as early as 1676.<sup>8</sup> Yet its antecedents may just as likely have been philological or anthropological in character; and it would be interesting to know whether or not the growth of the Darwinian theory had been responsible for the shift of emphasis. Schneider, both in his articles in the *Vierteljahrsschrift für wissenschaftliche Philosophie* and his larger investigations, had done a great deal to popularize the term and assign to it a biological setting. But the designation was apparently in vogue over fifty years ago, and from its usage then one would get the notion that comparative psychology was most closely affiliated with *Völkerpsychologie* and not at all with animal psychology. Thus Bastian writing on comparative psychology in 1868<sup>9</sup> does not mention the possibility of including under that heading the study of animal psychology. He simply takes it for granted that comparative psychology is the study of different groups of men and their cultural products.

The first reference to comparative psychology I was able to discover in English was again in connection with anthropology rather than anatomy; and it was Herbert Spencer who wrote the article—by the way the very first article in *Mind*—in which he proposes the establishment of a new field of science dealing with the *Comparative Psychology of Man*.<sup>10</sup> This field was to be divided up into three classes which, from our more modern point of view, are scarcely

<sup>8</sup> *The Comparative Anatomy of Stomachs and Guts*, "Being Several Lectures Read before the Royal Society in the year 1676 by Nehemiah Grew, M.D., Fellow of the Royal Society and of the Colledge of Physitians," London, 1681. This early use of the term comparative in conjunction with anatomy certainly tends to disprove the conjecture made by C. Read (*British Journal of Psychology*, Vol. VI., p. 45) that the concept of comparative science first appeared in connection with philology, thence it was taken over into anatomy. The circumstance further leads us to doubt his further thesis which postulates the belief in the continuity of descent before science could be treated comparatively. We may safely assume that Nehemiah Grew had no inkling of the modern principle of evolution.

<sup>9</sup> A. Bastian: "Zur vergleichenden Psychologie," *Zeitschrift für Völkerpsychologie und Sprachwissenschaft*, Vol. V., pp. 152-180. See also his *Beiträge zur vergleichenden Psychologie*, which is wholly an ethnographic study.

<sup>10</sup> H. Spencer: "The Comparative Psychology of Man," *Mind*, 1876, Vol. 1, pp. 7-8.

adequately defined, but which might roughly correspond to (a) anthropological data ("degrees of mental evolution of different human types"), (b) sex differences, and (c) individual and ethnic differences.

Spencer's article of course does not remove the possibility that he recognized the existence of a comparative psychology of animals as well, but at any rate we may be quite certain that comparative psychology fifty years ago was not attached to the same moorings that hold it to-day; and furthermore it is not likely to have sprung up under the lead of comparative anatomy. Just at what time the term was torn away from its old moorings and began to be associated with the activities of the naturalist is a problem not easily solved. At the same time we should be disinclined in this connection to accept Dr. Yerkes's statement that "*accidentally rather than by the deliberate intent of any psychologist or group of psychologists*, the term comparative psychology has come to mean the study of mind in organisms other than man."<sup>11</sup>

While we may fail to trace the actual process of the transition, we need not necessarily declare our ignorance of the causes that led to the change. One of the contributory factors in bringing about the present status of comparative psychology seems to have been the steady rise of the natural sciences since the promulgation of the evolutionistic doctrine. The popularity of comparative anatomy, coupled with the fact that the anthropological and collective phases of psychology were beginning temporarily to decline, was naturally influential in wresting comparative psychology as a term from its old setting, but the actual motive force in that regard was the zeal of animal psychologists, whose pretensions to the broadest possible endeavors in their chosen science rendered them oblivious to the fact that the study of man and men of all stages, levels and ranges was at least an important item in our account.

### III

Of late there has been a growing tendency to talk of comparative psychology as a method. This usage has been especially urged by Yerkes and Carveth Read. The former points out that the adjective comparative refers rather to the method of a science than to its materials, as attested by comparative anatomy, embryology, pathology, and physiology.<sup>12</sup> The latter declares almost *ex cathedra* that "Com-

<sup>11</sup> R. M. Yerkes: "Comparative Psychology: A Question of Definitions," this JOURNAL, 1913, Vol. X., p. 580 (italics not in original).

<sup>12</sup> R. M. Yerkes: *loc. cit.*

parative Psychology is merely Psychology treated by the Comparative Method.'"<sup>13</sup>

This view is of course a tenable one, but it hardly tells the whole story. Against Yerkes's arguments it may be urged that the status of comparative anatomy or embryology is confronted with just about the same problem as that of comparative psychology, so that the attempt to establish the case of the one on the basis of the other constitutes a flagrant *petitio principii*. Moreover, there are a number of other comparative sciences which should enter into our consideration before mapping out the boundaries. Psychology, which has often suffered restrictions at the hands of the more exact sciences, can well afford to adopt a more latitudinarian position towards such branches as comparative literature, comparative religion, comparative mythology, *etc.*, where the materials are indubitably important *per se*.

Sciences have been subdivided into branches and fields for the sake of convenience. Now if it is granted that comparative psychology is merely a method, then we might as well do away with experimental, genetic, and applied psychology as fields. If we continue to regard experimental psychology as a division rather than a method, there is no reason why we should not accord the same treatment to the subject at issue. In the colorless denomination "method," comparative psychology is bound to lose its identity in a hazy mist, partly for the reason that the term method has been employed in a number of different connections. Systems of philosophy have been referred to as methods by their originators; but while it is true that every particular brand of philosophy or art requires a definite approach in order to be reached, it is not as a rule the avenue of approach that the system or school is remembered by but its conclusions or results.

At the root of the new suggestion proposed by Yerkes and Read is probably the circumstance of the vastness and comprehensiveness of such a branch as comparative psychology. Though not expressed by either of them, their objection may be to the effect that the innumerable details of comparison would become too cumbersome for any one man to cope with and that the whole field could never be explored. It may be supposed then that if the comparative psychologist should tackle the whole sphere which rightly is his domain, his plight would be a helpless one; while if he narrows himself down to one department, such as animal or group psychology, he thereby forfeits his comprehensive position—and naturally in either case no room is left for the field of comparative psychology.

<sup>13</sup> Carveth Read: "The Comparative Method in Psychology," *British Journal of Psychology*, 1913-14, Vol. VI., p. 44.

Happily, however, as in most of the dilemmas, the two courses mentioned by no means exhaust all the possibilities. Just as comparative literature does not impose upon its student the requirement of becoming conversant with every story and essay that has appeared in any language, but merely necessitates an acquaintance with the main types and schools of universal literature, so the comparative psychologist is not called upon to study in detail all the genera and species of the race, and then the intelligence levels and group traits of human society, but is expected to take up the results of special investigators in the different departments of psychology *with a view to formulating some general laws or observations which are necessarily beyond the scope of the restricted investigator.*

In this way the comparative psychologist assumes the rôle of an interpreter after sifting and colligating the mass of data furnished by the special investigators. The distinctive feature of comparative psychology, it should be borne in mind, is *comprehensiveness*. *It is not a special field, but the entire province of psychology covered in a special way.* The comparative psychologist, properly speaking, is to cover the *whole* territory though not all of it. Selection of the resting or dwelling spots would have to play the most important part in his movements.

For this reason, the comparative study of the behavior of two species of birds or mice would in itself not fall under the rubric of comparative psychology. On the other hand, the establishment or disproof of the recapitulation theory on the evidence gained from a survey of different classes of minds brings the subject within the most comprehensive realm. Not all the untiring efforts and zeal of Fabre and the Peckhams would entitle them to the place occupied by men who have availed themselves of the indefatigable labors of these as well as other investigators, including naturalists, psychopathologists and sociologists, not to mention psychologists of every class and order. In drawing his generalizations from the individual reports and observations of field workers, he resembles the philosopher, though his task is both more circumscribed and less speculative. In fact his conclusions in themselves are to serve as a link in the chain which is in the process of being forged by the philosopher.

We are thus brought to realize that the dropping of comparative psychology from a comprehensive classification of psychological branches, as the editors of the Psychological Index have seen fit to do, is a gratuitous step which lays itself open to just as much criticism as the original lumping of all researches in animal behavior under the head of comparative psychology.      A. A. ROBACK.